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ABSTRACT

The purpose of this report is to present the status of Orange County School District's Energy Management program to selected management personnel. Included in this report are various background papers which comprise the body of the publication. The first and largest paper is entitled "Energy Management in the Orange County Public Schools." This paper presents an overview of the programs undertaken by the District in the past six years and proposes future efforts in total energy management. The second paper presents the functions and responsibilities of the Energy Management Conservation Program. The third paper presents guidelines for establishing an Energy Conservation Committee within each school building. It suggests the major responsibilities to be assigned to key personnel and it provides a list of energy conservation tips for consideration by the committee. (MR)

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# STATUS OF THE

# ENERGY MANAGEMENT PROGRAM

# IN THE ORANGE COUNTY PUBLIC SCHOOLS

TO:

SELECTED PERSONNEL

BY

LARRY K. BOYD

SUPERVISOR OF ENERGY UTILIZATION

SEPTEMBER 22, 1978

SE 025 451

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B. Revised Organization

C. Energy Management Guideline Report

## I. INTRODUCTION

The purpose of this report is to present the status of the District's Energy Management program to selected management personnel. The document is brief and does not expound on any specific topic; previous reports are included for reference.

The Energy Management group has reviewed many "Energy" plans and programs from across the United States and have been very selective in incorporating what they feel were the key elements into this program.

Further, the Energy Management group for this District has shared their program and ideas with surrounding School Districts and extend an open invitation to any other governmental organization or group approved by the Energy office to review Orange County's program.

## II. ENERGY MANAGEMENT PROGRAM

The Energy Management program in the Orange County Public School system was formally recognized in November 1977, by action of the School Board with the acceptance of the Energy Management proposal (see Appendix). As explained in the proposal, prior to November 1977, the District staff had been unofficially dealing with energy matters on a lesser scale.

With recognition by the Board, the Energy Management group began to function as an entity within the District. A brief statement of the status and future plans of the three (3) sub-groups in the Energy Management group is given.

A. Awareness Group

The purpose of this group is to inform and educate the general public, students, faculty and District staff of energy conservation. Projects in force at this time include a puppet show for K-6 graders, coordination of State educational grants dealing with energy, and formulation of workshops. Future plans of this group include a continuation of those endeavors mentioned above, plus overseeing the development and implementation of various educational programs for District employees and students in, "what they can do to conserve energy".

B. Data Group

The purpose of this group is to coordinate the development of a computer program for storing and disseminating energy consumption data. The group has compiled complete energy consumption data from July 1976, to the present. Currently, the group is working closely with the District's Management Information section in the development of an on-line data processing program. The program is expected to be operational by January 1, 1979.

The program will provide all work centers with up-to-date information on their energy consumption. Reports will be issued monthly.

C. Technical Group

The purpose of the Technical group is to evaluate new products and methods of energy conservation and conduct all surveys dealing with energy conservation. Further, the Group is responsible for in-house electro-mechanical retrofits.

To date, the group has conducted two (2) mini-audits and reviewed approximately twenty (20) methods or products. The group has initiated a scheduled boiler efficiency check on all flame fired boilers in the District.

It is proposed to conduct a mini-audit in all District facilities by March 31, 1979, and recommend a schedule for selected maxi-audits by May 1, 1979.

APPENDIX

Original Energy
Management Prop

# ENERGY MANAGEMENT

# IN THE ORANGE COUNTY PUBLIC SCHOOLS

TO:

MR. ROBERT E. CASCADDAN

Deputy Superintendent
Support Services

and:

MR. THOMAS E. EWART

Assistant Superintendent
Facilities Services

BY:

CURTIS B. JOYNER

Director of Maintenance

September 26, 1977

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## I. INTRODUCTION

The purpose of this report is two fold: to present an overview of the programs undertaken by the District in the past six (6) years as related to utility cost reduction and propose future efforts for a total ENERGY MANAGEMENT program within the Orange County Public School System.

The first part of the discussion deals with various methods that the Facilities Services Department has employed to realize a cost reduction in the District's utility costs during the past six (6) years. This discussion is intended to be an overview of the methods and not an indepth technical dissertation.

The second part of the discussion proposes the formal establishment of an ENERGY MANAGEMENT GROUP for the purpose of providing a concerted effort of energy management to the District. The GROUP, once established, will be responsible for the development of policies and methods.

## II. SUMMARY

During the past six (6) years, the District has modernized or renovated facilities and in doing so, realized a cost reduction in utilities. Examples of these cost reduction methods are new lighting systems, deletion of excessive electric meters, oil-to-gas conversions, heating and air conditioning controls, heat recovery, and solar energy.

These programs have been effective in their purpose but now the District must look beyond these limited endeavors and provide a concerted effort of energy management. Needless to say the rising cost of utilities is becoming a burden on the District budget.

It is proposed that the District establish an ENERGY MANAGEMENT GROUP. With the establishment of a formal ENERGY MANAGEMENT GROUP, the personnel of the Orange County Public School System would be in a position to plan and implement measures which could realize a yearly dollar savings far exceeding the cost to establish and maintain the GROUP. A yearly savings in excess of $300,000 is not unrealistic.

It is proposed that the GROUP be composed of a Central Policy Committee and three (3) subordinate, or working groups. The Central Policy Committee would provide direction for the subordinate groups. These groups would be responsible for implementing and monitoring the program.

The initial expenditure for personnel and material would be minimal. The scope of the second year of operation would be dependent upon the direction given by the Committee.

## III. DISCUSSION

### A. Past and Present Programs

The District has been actively engaged in energy management to some degree since the summer of 1971. At that time, Project Cool began combining electric meters in a "cost reduction" program.

Since the energy crisis of 1973, the Maintenance and School Planning Sections have made efforts to institute programs of energy conservation in the fields of more efficient lighting sources, heating and air conditioning controls, oil-to-gas conversions, heat recovery, and solar energy. The following discussion categorizes the various programs mentioned and briefly describes the efforts.

#### 1. Electrical

In the Orange County Public Schools, electrical energy represents the major portion of utility expenditures. The District is not unique in this sense. Electrical energy consuming devices have become a standard design criteria within the past decade. That is, schools have been air conditioned, lighting levels increased, and fossil fuel heating systems replaced by electric resistant heating. These components were justified for the following reasons:

air conditioning - learning environment

lighting - compliance with State regulations and learning environment

heating - maintenance cost

In analyzing methods of energy management where electrical consumption is concerned, three (3) prime areas become apparent as a basis for cost reduction and conservation - metering, lighting, and heating and air conditioning.

a. Metering

Prior to the energy crisis, multiple electric metering installations were a way of life for school buildings. This was because of inexpensive energy vs. the expense of installing a single meter requiring long and large electric feeder lines from the meter to the various areas of the campus.

> Fact. Historically, a multiple electric meter installation is more expensive to a consumer than a single meter installation although both installations use the same amount of electric energy. This is the result of the rate structure used by the utilities - the more the consumer uses per month the less, per kilowatt hour, it becomes.

For this reason multiple electric meter installations are being eliminated where feasible. The most obvious cases of multiple electric meter installations are those serving portable buildings. It was a practice when energy was inexpensive to meter each portable. Since the energy crisis became a reality, the Maintenance Section has been clustering portable buildings in groups of two or more, up to six, and serving the cluster with a single meter.

Also, special meters serving areas such as kitchens have been eliminated and the electric service provided through the main service to the school.

It should be noted that the reduction of multiple meter installations does not constitute energy conservation but rather a pure cost reduction.

b. Lighting

Four years ago the Department began installing new lighting systems in the District schools. This was to comply with State Department of Education regulations for increased lighting levels but had the benefit of decreasing the electric consumption because of the availability of more efficient light sources. The relighting project is scheduled to encompass 75% of the schools.

For example, a typical classroom was lighted with twelve (12), 500 watt (6000 watts total) incandescent fixtures which produced 25 foot-candles of light at desk level. These were replaced with (14), 4-tube, 4-foot fluorescent fixtures which produced 70+ foot-candles at desk level while consuming only 2800 watts. As an experimental installation, one relighting project, Robert E. Lee Jr. High, was accomplished with high pressure sodium vapor fixtures which are more efficient than the fluorescent fixtures; however, the initial cost of this type of installation was considered excessive and consequently no further installations are proposed.

c. Heating and Air Conditioning

The consumption of electric energy for heating and air

conditioning represents a major portion of a school's total consumption. Unfortunately, other than control, very little can be done to reduce the consumption on the basic unit. That is, insulation, storm windows, etc., are not considered part of the heating or air conditioning perse'.

The control of the heating and air conditioning systems is critical where economizing is concerned. To this date, the only facility undergoing experimentation related to operational control is Winter Park Senior High. This facility is designed around a total electric concept and lends itself to control modification very easily. For instance, time clocks have been installed on the heating and cooling systems to provide environmental control at predetermined times.

2. Fossil Fuels

Fossil fuels consumed by the District are fuel oil and gaseous fuels such as natural gas and propane. These fuels supply energy for comfort, heating and domestic hot water.

During the period of 1973 - 1975, fifty-nine (59) District facilities were converted to natural gas from fuel oil because of the greater availability of the fuel, lower fuel rates, and lower maintenance cost. With the addition of these facilities, approximately seventy (70) facilities are now provided with natural gas.

3. Heat Recovery

Heat recovery is a term normally applied to recovering an energy source, usually heat, from a device requiring dissipation of energy for its basic operation. The most notable of the devices is an air conditioning unit.

During normal operation, the hot gas from the compressor, prior to entering the condenser, is at a temperature of approximately 190°F. Methods are available to transfer this energy source to a water media; the water in this elevated temperature state is then used as makeup water to boilers or piped directly for use as domestic hot water.

There are a number of ideal installations in the District where a heat recovery system could be utilized. During 1976, a system was installed at Lancaster Elementary School to preheat the domestic water entering the boiler heat exchanger serving the cafeteria. The limitation of such a system is that the air conditioning system must be in operation.

4. Solar Energy

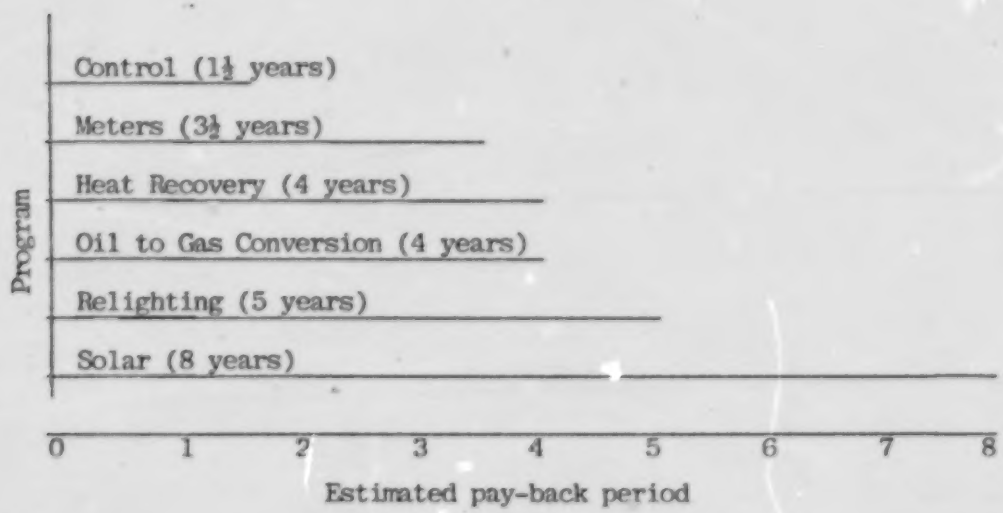
The Facilities Services staff has investigated utilizing solar energy for various heating applications. However, because of the initial cost, the commitment to solar energy has not been complete. Only one installation is operational in the System to date - a restroom serving a portion of the Central Maintenance compound is supplied

with solar heated water. Other installations investigated for solar energy utilization were the swimming pool heaters at Winter Park Sr. High School, cafeteria domestic hot water and makeup water for boilers.

The District is monitoring the available literature and is keeping updated on new developments in the field.

B. Assessment of Effectiveness

In a general sense, all of the programs have been effective. The basis for measuring the effectiveness of the program is the pay-back characteristics. This method allows a comparison of the different programs and establishes a measurable quantiy. The following graph depicts an average pay-back characteristic of the various programs based on the current utility or fuel costs and an absolute cost regardless of source of funding.




Using a six (6) year pay-back as a break-even point it can be seen that a solar installation is the only type of program presently not feasible economically. However, if the present trend in utility

cost continues, a solar program for the District will become attractive.

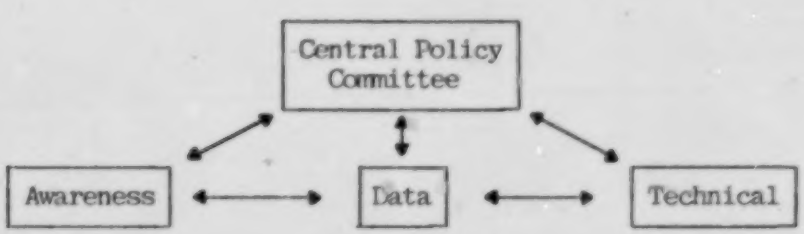
As noted above, effectiveness or comparisons shown on the graph depict only a nominal pay-back characteristic of the individual programs. The effectiveness of any individual installation must be judged on its own merits.

## C. Proposed Future Programs

Because of the energy crisis, it is imperative that the District establish an ENERGY MANAGEMENT program to deal with the various aspects of energy conservation and act as a coordinating office for all matters relating to energy. It is estimated that an effective program will save the District in excess of 10% the current utility cost per year. Based on a recent accounting of the electric, gas and fuel oil expenditures, this savings could amount to approximately $370,000 per year.

### 1. Organization

It is proposed that the GROUP be composed of a Central Policy Committee with three (3) subordinate groups.




The Central Policy Committee would be the governing body of the GROUP and provide direction for all activities of

the GROUP and provide direction for all activities of the GROUP. The Committee would establish policy effecting all personnel of the District.

The three (3) subordinate groups would be the action or working groups responsible for implementing and formulating programs, conducting field investigations, data collection and computations, and any other related duty as the Central Committee designates.

The Awareness group would be responsible for all educational programs associated with the ENERGY MANAGEMENT program. It is proposed that the person heading this program be an educator familiar with the science programs existing in the District.

A major responsibility of this group would be to educate the general student body and all teachers and administrators in the District as to the severity of the ENERGY crisis and what THEY can do to HELP. Further, this group would investigate the availability of grants and other funding sources which could assist in the implementation of the District's programs.

The Data group would be responsible for the collection of all statistical data, such as energy consumption, all computations, and the compilation of energy related comparisons.

The Technical group would be responsible for all field programs.

This includes, mini and maxi audits or energy surveys of District facilities and the analyses of building and equipment modifications for energy conservation.

2. Staffing

The initial staffing of the ENERGY MANAGEMENT GROUP would not require any new District positions. It is proposed to initially staff the GROUP with personnel currently employed by the System. The second year of operation may require additional personnel or a reclassification of existing personnel. The latter proposition is contingent upon volunteer assistance from outside professionals and the direction provided by the CENTRAL COMMITTEE.

It is proposed that the Central Committee be composed of a minimum of thirteen (13) assigned District personnel and six (6) volunteer members.

The assigned members would represent all levels of management. The volunteer members would be representatives from the utilities, professions, and public. The following is a proposed membership of the Committee:

School Board Member
Deputy Superintendent for Support Services
Deputy Superintendent for Instructional Services
Assistant Superintendent for Facilities Services
Assistant to Superintendent for Project Development
Director of Maintenance
Director of School Planning
Chairman of Awareness Group
Coordinator of Energy Management (2nd year)
Principals (4)
Volunteer Representatives (6):

| | |
|---|---|
| Consulting Architect | Florida Power Consultant |
| Consulting Engineer | Florida Gas Consultant |
| O.U.C. Consultant | Community at Large |

The Awareness group would initially be staffed with two (2) science orientated District educators and a representative from the Public Information Office.

Presently, the DATA and TECHNICAL groups are functioning within the Facilities Services Department with three (3) administrative/field personnel. That is, the programs discussed earlier in the report as Past and Present Programs are continuing programs and require planning and supervision.

Further, a data file on energy consumption is being compiled by staff members of the Facilities Services Department. Actually a nucleus of three (3) personnel is operating as the DATA and TECHNICAL groups. It is proposed to retain this nucleus of three (3) people for the first year of operation.

In summary, the initial personnel/membership requirement for the ENERGY MANAGEMENT GROUP would be as shown:

| | |
|---|---|
| Central Committee | 19 |
| Awareness Group | 2 |
| Data Group | 1 |
| Technical | 2 |

The second year of operation may require additional personnel and/or positions depending upon the direction of the Central Committee. A large expenditure for materials and equipment is not foreseen for the first year of operation. The Maintenance Section currently has the basic field equipment to initiate the ENERGY MANAGEMENT program and, within reason, to supply any materials necessary.

# APPENDIX

## A. Acknowledgements

A number of people provided information and/or data for this report. Special recognition is given to Mr. Charles R. Sheppard of the Mead Environmental Center for his comprehensive study on energy use in the Orange County Public Schools and his continued interest in the energy conservation efforts proposed for the District.

Further, appreciation is extended to the officials of the Florida Power Corporation, Orlando Utilities Commission, and Florida Gas for their support and suggestions in energy conservation.

B. Proposal Background

The initial authorization for this proposal came from Mr. Robert E. Cascaddan, Deputy Superintendent for Support Services, who recognized early in the energy crisis that the District would be facing a severe financial crisis as the result of utility cost increases. Subsequently, authorization was given for the staff of the Facilities Services Department to attend various workshops and technical seminars relating to energy management.

The more noted of these workshops have been as follows:

January, 1976 - Workshop on Environmental Conditions

March, 1976 - Workshop on Energy Consumption in Florida State Schools

January, 1977 - Workshop on Energy Management - CEFP

May, 1977 - Seminar on Solar Energy Use - Helio Science Institute

June, 1977 - Seminar on Application of Computers to Energy Management - I.B.M.

July, 1977 - Workshop on Energy Management - Federal Energy Administration

C. References

Cowan, Dr. James F., The Energy Crisis in the Public Schools: Alternative Solutions, Ventura, California, January, 1974

"Energy Management for Colleges and Universities", National Association of College and University Business Officers, Washington, D. C., 1977

Federal Energy Administration, A Guide to Reducing Energy Use Budget Costs, Washington, D. C., 1977

Federal Energy Administration, Managing the Energy Dilema: Increasing Energy Efficiency, Washington, D. C., July, 1977

Federal Energy Administration, Workshop on Managing Energy Use, Washington, D. C., January, 1977

Hearing Before the Select Committee on Small Business United States Senate, Energy Research and Development and Small Business, Washington, D. C., U. S. Government Printing Office, May 23, 1977

"IES Lighting Handbook", Illuminating Engineering Society, 345 East 47th Street, New York, N. Y., 1972

"I'm Saving Energy with Les Fuel!", Broward County Energy Conservation Program, Ft. Lauderdale, Florida, July, 1976

Joint Hearing Before the Select Committee on Small Business and the Committee on Interior and Insular Affairs United States Senate, Alternative Long-Range Energy Strategies, Washington, D. C., U. S. Government Printing Office, December 9, 1976

"Key Elements of a National Energy Strategy", Committee for Economic Development, Georgian Press, Inc., June, 1977

Root, Douglas E. Jr., "Practical Application of Solar Energy in Florida", Florida Scientist, Orlando, Florida, Florida Academy of Sciences, Volume 39, Summer, 1976

Sheppard, Charles R., Patterns of Electrical Consumption in the Orange County Public School System 1975-76, Orlando, Florida, May, 1977

"Solar Utilization News", The Alternate Energy Institute, Estes Park, Colorado, January, 1976 to present

D. Existing Adminstrative Procedures

The following administrative procedures dealing with energy conservation were adopted by the District dur g the initial phases of the energy crisis. These procedures were intended to be used as guidelines by school personnel to reduce the energy consumption in their physical plant.

1. The following standard operating hours for all air conditioning and heating equipment in School Board owned or operated facilities shall be as follows: From one half hour prior to the reporting time for the instructional staff or office personnel to one half hour after the conclusion of the regular working day of the instructional staff or office personnel. In the event, extra curricular or educational activities extend beyond this time, the air conditioning and heating equipment shall be turned off no later than one half hour after the completion of the activity. In no event shall any heating or air conditioning equipment be operated over night.

2. All air conditioning and heating equipment in Orange County School Board owned or operated facilities shall be turned off during weekends and vacation periods.

3. All thermostats located in Orange County School Board owned or operated facilities shall be set at the following levels: heating cycle 70°F., cooling cycle 75°F. Any deviation from these levels shall be approved by the principal or work location supervisor after consultation with the area maintenance supervisor.

4. Lighting

   A. All exterior building lights shall be turned off during daylight hours.

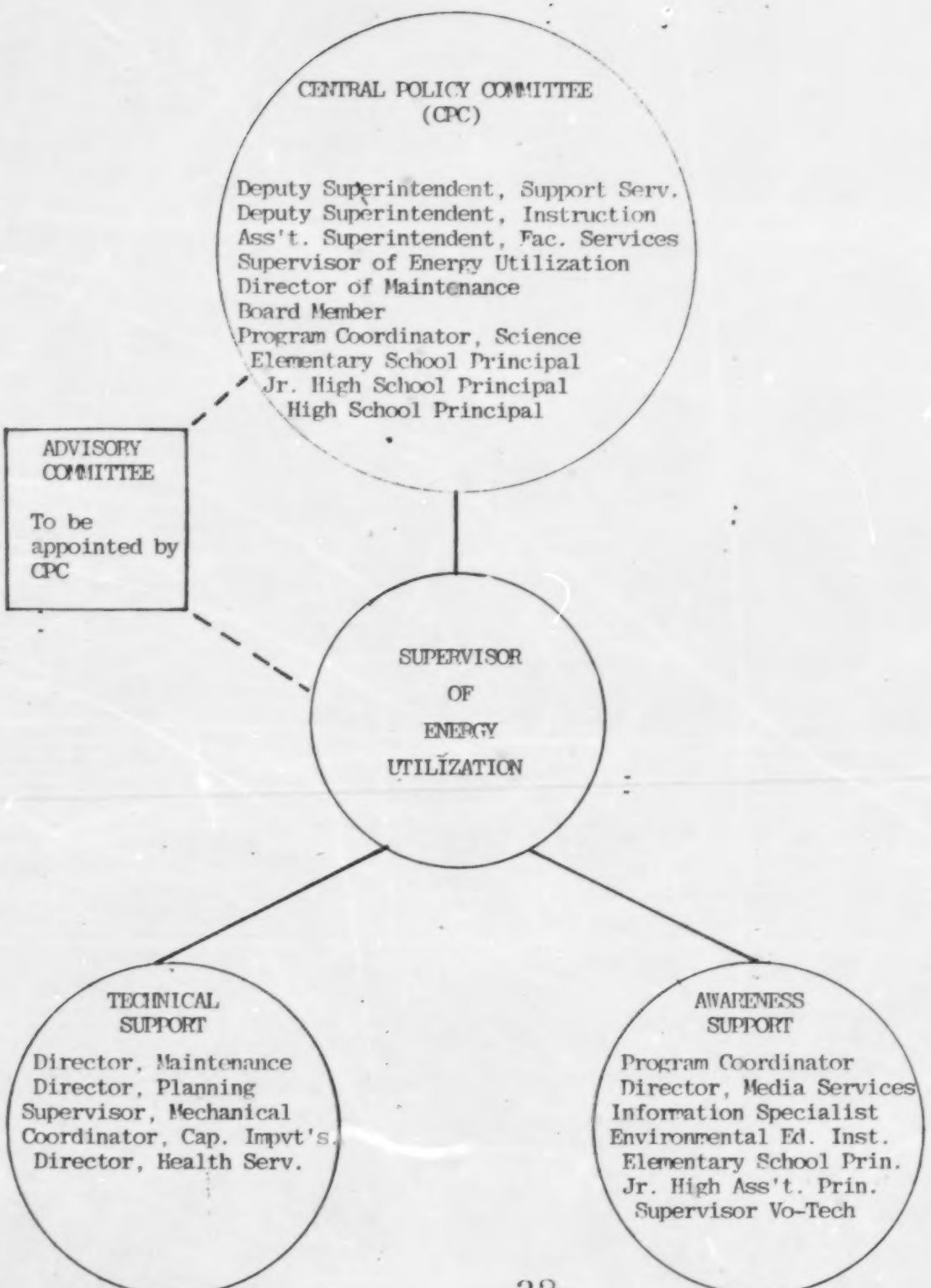
   B. All classroom, office, gymnasium and other interior lighting shall be turned off when the space is not occupied.

   C. All security lighting shall be reduced to a minimum.

   D. The principal or building supervisor shall be responsible for designating a member of his custodial staff to survey the building and site to insure that unnecessary lighting is not left on. This shall be accomplished as a part of the routine duties connected with the securing of the school facility or work location.

5. Energy Conservation Task Force - Each maintenance area office shall have a task force which shall inspect all buildings and work locations in the company of the head custodian, principal and/or building supervisor to determine means of conserving energy. Procedures to accomplish these conservation measures shall be established jointly by members of the task force, the head custodian, the principal and/or building supervisor. The task force shall conduct periodic inspections of the school facility or work location to insure continued compliance with the established conservation measures. These inspections shall take place in the company of the head custodian, principal or building supervisor.

Revised
Organization


CENTRAL POLICY COMMITTEE
(CPC)
Deputy Superintendent, Support Serv.
Deputy Superintendent, Instruction
Ass't. Superintendent, Fac. Services
Supervisor of Energy Utilization
Director of Maintenance
Board Member
Program Coordinator, Science
Elementary School Principal
Jr. High School Principal
High School Principal
ADVISORY COMMITTEE
To be appointed by CPC
SUPERVISOR OF ENERGY UTILIZATION
TECHNICAL SUPPORT
Director, Maintenance
Director, Planning
Supervisor, Mechanical
Coordinator, Cap. Impvt's.
Director, Health Serv.
AWARENESS SUPPORT
Program Coordinator
Director, Media Services
Information Specialist
Environmental Ed. Inst.
Elementary School Prin.
Jr. High Ass't. Prin.
Supervisor Vo-Tech

## FUNCTIONS AND RESPONSIBILITIES

### CENTRAL POLICY COMMITTEE

FUNCTION:

The Central Policy Committee (CPC) shall provide direction to the District-Wide Energy Management Conservation Program and act as a clearing house for all proposals developed by the Technical and Awareness Support Groups. The Deputy Superintendents shall be responsible for liaison between the CPC and the Superintendent.

RESPONSIBILITIES:

1. Establish a basis for the development of a District-Wide Energy Management Program/Mission.

2. Establish the goals and objectives which will lead to the fulfillment of the Mission statement.

   A. Short Range - 1 year

   B. Long Range - 2 to 5 years

3. Establish a Technical and Awareness Support Group.

4. Develop components which will be utilized by the CPC to determine the effectiveness of the Technical and Awareness Support Groups including monitoring and evaluation techniques.

5. Develop policy recommendations to be submitted to the School Board through the Superintendent.

6. Develop budgetary recommendations relative to the Energy Management Program.

7. Assist in the implementation of components upon request of the Supervisor of Energy Utilization.

8. Establish operational/organizational procedures for CPC.

9. Appoint members to the Advisory Committee.

10. Review all grant proposals prior to submission to Superintendent for recommendation to the School Board.

ADVISORY COMMITTEE

FUNCTION:

The Advisory Committee is to be comprised of persons from without the formal organization of the school system who have expertise relating to energy management/conservation. Membership shall be determined by the CPC.

RESPONSIBILITIES:

1. Upon request of the Supervisor of Energy Utilization, members of the Advisory Committee shall provide:

   A. Technical assistance.

   B. Reaction to proposals.

   C. Liaison service to industry.

   D. Liaison service to community.

SUPERVISOR OF ENERGY UTILIZATION

FUNCTION:

The Supervisor of Energy Utilization (SEU) shall serve as liaison between the Advisory, Technical, Awareness Groups, and the CPC. The SEU shall coordinate the implementation of all programs related to energy management and conservation. The SEU shall be a member of the Facilities Services Staff and shall be directly responsible to the Director of Maintenance.

RESPONSIBILITIES:

1. Review all requests of Technical and Awareness Support Groups for assistance.

2. Review all proposals developed by the Technical and Awareness Support Groups prior to submission to CPC.

3. Maintain a library of materials/consultants relative to energy matters.

4. Keep abreast of developments in the field of energy management and conservation i.e.: literature, programs, grants.

5. Maintain a file of available grants or other means of obtaining financial assistance.

6. Maintain scheduled contact with the chairmen of Technical and Awareness Support Groups.

7. Assist the chairmen of the Technical and Awareness Support Groups in the identification of alternative strategies for reaching objectives.

8. Administer departmental budget.

9. Serve as a clearing house for requests by work location managers for assistance.

10. Provide in-service training required for accomplishing goals and objectives.

11. Insure that energy audits are conducted on a regularly scheduled basis and maintain file for all audits.

12. Coordinate collection of and maintain data relative to District-Wide energy utilization and costs.

13. Distribute information and materials relative to energy utilization to work locations.

TECHNICAL SUPPORT GROUP

FUNCTION:

The Technical Support Group (TSG) shall be comprised of Facilities Services Support Personnel (Directors, Coordinators, Supervisors). The Director of Maintenance shall serve as chairman. The Assistant Superintendent for Facilities Services and the SEU shall be ex-officio members of the TSG. The TSG shall provide technical expertise relative to the utilization of energy within the District's facilities. The activities shall include the identification of areas of mis-management, recommended corrective actions and the monitoring of their implementation.

RESPONSIBILITIES:

1. Conduct of mini-audits.
2. Recommend procedures for conduct of maxi-audits.
3. Identification of construction deficiencies by field personnel.
4. Insure inclusion of energy conservation features in new construction.
5. Develop and maintain an operational guide related to energy utilization.
6. Develop and implement an orientation program for personnel who have plant operational responsibilities.
7. Recommend mechanical changes including cost benefit - cost avoidance analyses.
8. Provide technical assistance in the development of grant proposals.
9. Develop initial budgetary proposals.
10. Develop monitoring and evaluation procedures for all proposals submitted for implementation.
11. Inform SEU of all activities through regularly scheduled conferences.
12. Ensure compliance with all energy mandates related to the operation of the District's facilities under the direction of the Assistant Superintendent for Facilities Services.

AWARENESS SUPPORT GROUP

FUNCTION:

The Awareness Support Group (ASG) shall be comprised of the Program Coordinator for Science, Director of Media Services, Information Specialist, Environmental Education Instructor, Elementary Principal, Jr. High Ass't. Principal, and Supervisor for Industrial and Technical Education. The Program Coordinator of Science shall serve as chairman. The ASG shall provide technical expertise relative to the educational programs associated with the Energy Management Program.

RESPONSIBILITIES:

1. Develop a professional visual presentation for administrative and faculty use related to energy conservation techniques.

2. Conduct energy management conferences for administrative staff, custodial personnel, maintenance and facility personnel, teachers, and student groups.

3. Publish data bulletins.

4. Publish energy audits on school energy use as well as compiling energy related comparisons.

5. Develop in-school and community awareness programs and activities.

6. Publish handbooks.

MEMBERSHIP:

CPC

| | |
|---|---|
| Robert E. Cascaddan | Deputy Superintendent, Support Services |
| Dr. James Schott | Deputy Superintendent, Instructional Services |
| Tom Ewart | Assistant Superintendent, Facilities Services |
| Larry Boyd | Supervisor of Energy Utilization |
| Curtis Joyner | Director of Maintenance |
| Ethel Lyons | Board Member |
| Dallas Maddron | Program Coordinator, Science |
| Wanda Denny | Principal, Gateway |
| Howard Flemming | Principal, Conway Jr. |
| James Roberts | Director, McCoy Vo-Tech Center |

ADVISORY COMMITTEE

| | |
|---|---|
| Allen Helman | Consulting Architect, Helman, Hurley, Charvat, Peacock Arch., Inc. |
| Edward Lobnitz | Consulting Engineer, Tilden, Denson & Lobnitz, Inc. |
| Don Manley | Orlando Utilities |
| Ronald Steinacker | Florida Gas |
| Jay Yost | Florida Power |

SUPERVISOR OF ENERGY UTILIZATION

Larry K. Boyd

TECHNICAL SUPPORT

| | |
|---|---|
| Curtis Joyner | Director of Maintenance |
| Dave Spear | Director of School Planning |
| Bill Gaskins | Supervisor of Mechanical Maintenance |
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Energy Management
Guideline Report

# ENERGY CONSERVATION GUIDELINES

# IN THE ORANGE COUNTY PUBLIC SCHOOL FACILITIES

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## I. INTRODUCTION

The key characteristic of Energy Management is C O M M I T M E N T. The principal is probably the one person who can make the energy conservation plan succeed because most activities relating to the overall Energy Management program will involve him. It is not enough to simply name different persons to an energy conservation task force, all members should be given general and specific duties if the District's energy conservation goals are to be achieved. Implementation of this program is not a "one shot deal". While certain initial steps must be taken, true effectiveness can be obtained only when management aspects are continued on a year round basis. The time required for successful implementation is not excessive; but even if it were, the potential savings to be obtained would more than offset the time and expense involved.

## II. PURPOSE

The purpose of this report is to provide guidelines for establishing an "Energy Conservation Committee" within each public school facility; suggest the major responsibilities to be assigned to key personnel; and, to provide a list of energy conservation tips for consideration by the school "Energy Conservation Committee".

## III. ROLE OF KEY PERSONNEL

### A. Principal

The principal of each shcool facility should organize a school energy conservation committee comprised of teachers, custodians, secretaries, students, and food service personnel; and under his direction, the committee is charged with the establishment and implementation of guidelines relative to energy conservation. The degree of interest displayed by the principal will influence the degree of conservation through the provision of leadership at various levels within the school's organization.

### B. Teachers

The teacher can best serve the overall energy conservation program by combining operational procedures with the curriculum. The teacher should respond to requests from the principal for assistance in devising new and improved conservation techniques especially applicable to their respective departments. The teacher can point out to the students what is being done on the campus and relate these ideas to the educational process. Ideas of the teachers which could add to effective conservation practices should be communicated to the principal and the "School Energy Committee".

### C. Students

The student body, comprising the largest group, can contribute more toward the overall energy conservation program

than all others in the public school system. If the students sincerely believe that there is a need to conserve energy and if they are provided the opportunity to pioneer in conservation, they can lead others in the beginning of a conservation revolution that must come about.

Students can benefit from the energy conservation program by assuming leadership roles and at the same time contribute towards their own future and that of others who will follow. Since students are represented on the "Energy Conservation Committee", they would also have the opportunity to translate their philosophies into the operational programs of the school facility.

D. Custodian

The custodian should feel the impact of energy conservation and appreciate it more than most other individuals within the School. For years many have strived to conserve without encouragement from others. Now, they have the opportunity to experience the participation of every occupant within their facility. The custodians understand the mechanical equipment and can be a very vital part of energy conservation. Through representation on the "Energy Conservation Committee", the custodial staff members can provide valuable input into ways to conserve energy.

E. Food Service

The school kitchen is one of the prime energy users in a school facility. Food Service personnel can be originators of very effective ways to conserve energy. There are several key areas in which good energy management practices can eliminate wasteful use of energy in the food service facility. The use, care, and proper operation of major pieces of cooking equipment such as refrigerated storage, hot food holding and transport equipment, and warewashing machines can effect energy savings. Through representation on the "Energy Conservation Committee", food service personnel will be able to provide valuable input and meaningful response to other energy saving ideas.

## IV. ENERGY CONSERVATION TIPS AND RECOMMENDATIONS

### A. Principal

1. Accepts responsibility for providing leadership and develops both a personal and school-wide commitment toward energy conservation.
2. Appoints a school energy conservation coordinator.
3. Selects an Energy Conservation Committee of teachers, custodians, students, and food service personnel, with the aid of the energy coordinator.

   a. Energy Conservation Committee

      i. Assesses "energy attitude" and consensus of school.

ii. Determines goals and objectives for a school-wide "energy conservation" program. (Long and short range.)

iii. Determines strategies, programs, techniques, etc., for meeting objectives.

iv. Determines resources available to implement strategies.

v. Makes recommendations for needed and appropriate action to energy coordinator, principal, and others.

vi. Provides necessary information and feed-back to "publics" associated with the Energy Management program.

B. Teachers

1. Encourage appropriate dress for indoor and outdoor activities including the wearing of sweaters and/or coats which may be removed.

2. Encourage the use of windows where available; limit the use of air-conditioning unless uncomfortably warm.

3. Recognizes that air conditioning may be utilized in the media center as a dehumidifier. Recognizes that when the center is unoccupied, a setting of 83° is sufficient to maintain a low humidity.)

4. Utilize some outdoor teaching for various disciplines on campuses which lend themselves to such activities (trees, patios, etc.).

5. Shuts off all electrical equipment when room is vacated.

6. Assign students responsibility to see that unnecessary lights are turned off. (Teachers should turn off lights when rooms are unoccupied. Recognizes that the longer lights are left on, more heat is given off, which requires more air conditioning.)

7. Stress to students the importance of turning off radio, television, and lights in the home when not in-use.

8. Encourage debates, 'brainstorming", and essays on such topics as:

   a. Pros and cons of daylight savings time.

   b. What is the potential for solar energy in Florida?

   c. What type of long-range plans can our government make to solve energy crisis? Are there alternatives for other methods of producing energy?

   d. Long-range affects of changing thermostats, fresh air, walking, upon an individual's general health.

   e. Importance of recycling various kind of material for fuel.

   f. How will lack of energy affect various aspects of American economy?

   g. Development of units pertaining to "conflict of values" as relates to energy conservation and pollution. Importance of a proper balance between the two.

h. How will lack of night lighting affect security of schools, homes, individuals? Will crime rate increase?

i. Discuss pros and cons of year round school program as it relates to energy conservation.

9. Explore possibilities of "around the school" field trips or trips which are within walking distance of school.

C. Students

1. Encourage the use of bicycles rather than motor vehicles.
2. Establish local energy conservation guidelines for students.
3. Establish and operate recycling centers.
4. Establish poster and slogan contests.
5. Provide awards for energy saving suggestions.
6. Involve students in all "energy conservation" activities.

D. Food Service Personnel

1. Cooking Equipment

a. Preheat only equipment to be used...just before using.

b. Reduce temperature or turn equipment off during slack periods.

c. Cook full loads on every cooking cycle...when possible.

d. Use the correct size equipment for all operations.

e. Avoid slow loading and unloading of ovens and opening doors unnecessarily.

f. Keep equipment clean for efficient operation.

2. Hot Food Holding and Transporting

a. Preheat equipment before loading.

b. Use at full capacity...when possible.

c. Clean thoroughly, daily.

3. Refrigeration Equipment

a. Keep doors tightly closed and avoid frequent or prolonged opening.

b. Place food in refrigerator or freezer immediately upon arrival from supplier.

c. Keep evaporator coils free of excessive frost.

d. Keep condenser coils free of dust, lint or obstructions.

4. Warewashing Equipment

a. Operate equipment at full capacity...when possible.

b. Flush after heavy meal periods - clean thoroughly daily.

5. Water Heating

a. Repair leaking faucets as soon as possible.

b. Reduce temperature where possible.

c. Insulate hot water pipes.

6. Ventilating System

a. Use only the number of fans necessary at all times to provide adequate ventilation.

b. Turn fans off upon completion of cooking processes.

c. Operate two-speed fans on the lower speed...when possible.

d. Keep filters and extractors clean.

E. Custodians

1. Work closely with the person in charge of the school's "energy conservation" program.

2. Work to reduce the electricity used.

3. Turn on equipment only when it is needed.

4. Turn off all air conditioners, fans, heaters, and lights (except a minimum number of outside security floodlights):

a. In classrooms at the end of the teacher's workday.

b. In offices when faculty and staff leave the facility.

c. On weekends and holidays.

5. Turn off electric water heaters on weekends and holidays.

6. Set room thermostats at:

a. 78° - 80° AIR CONDITIONING

b. 68° - 70° HEATING

7. Close tightly all outside doors and windows when air conditioning or heating are in use. (Remember,

to cool or heat the outside air is costly and totally unnecessary.)

8. Report leaks in ductwork on workorder.
9. Report damaged piping insulation on workorder.
10. Inspect all air filters once a week and change as needed.
11. Keep all flourescent light lenses clean.
12. Suggest new ideas to cut costs for electricity, oil, gas, water, sewer, trash, and telephone.
13. Implement specific guidelines for the school as issued by the principal.

F. Athletic Activities

1. Encourage the entire coaching staff to keep all night practice sessions to an absolute minimum, as well as to use only those lights necessary for immediate use --- utilize natural light whenever feasible.
2. Decrease the amount of hot water for use in washing practice uniforms, towels, etc., and in the showering of athletes after vigorous practice sessions, as well as games. Eliminate extra utilization of drying equipment by removing uniforms as soon as they are dry. Install shower heads in all athletic facilities that will restrict flow of water.
3. Use lights only when absolutely necessary, at night athletic contests, ie., turn out lights (stadium and gymnasium) whenever crowds have dispersed.

4. Lower temperature controls in the gymnasium and locker rooms as well.

5. Turn out lights in gymnasiums and locker rooms when not in use.

6. Schedule as many afternoon contests whenever possible, particularly junior varsity and junior high school football and basketball games; consider playing all baseball games in the afternoon.

G. Home Economics

1. Consolidate small baking projects by cooking in one or two ovens.

2. Turn out lights in each department area when not in use.

3. Use small appliances to supplement or replace large equipment.

H. Agriculture

1. Keep thermostats in shop areas turned down when shop is not in use.

2. Turn lights off when not in use. Place signs to this effect at all switches.

3. Keep doors closed except when in use.

4. Weather strip all doors and windows.

5. Use the proper size motor to do the job.

6. Turn off motors when not in use.

7. Insure that equipment is not overloaded.

## V. ENERGY CONSERVATION PROGRAM GUIDELINES

### A. Beating the Demand Charge

1. The electrical demand is defined as the power required by a piece of electrical equipment. Turning on ten 100-watt light bulbs all at the same time equal a demand of one kilowatt (kw). The greater the simultaneous use of electrical equipment which are high-inertia items, such as air conditioning units, require an additional demand when starting up to overcome inertia.

   a. Attempt to stagger the time that air conditioners or other heavy use equipment are turned on.

   b. Experiment with a later turn on to save electricity and demand. If the units are turned on by the custodian at 6:15 or 6:30 A.M. each day, turn the units on at a later time to determine if the school can be cooled to the desired temperature.

   c. If the cafeteria air conditioning has been turned on at the same time as the other units, experiment with turning on the unit 30 minutes before serving or using for letures or study periods.

   d. Encourage teachers or office personnel to turn off lights rather than having custodians perform this task.

### B. Lighting

1. Assess the total effectiveness of task lit furniture

before acquiring (i.e.: furniture w/lights built in), as the lighting may not be sufficient for other tasks such as cleaning, security, etc.

2. Use light finishes on walls, ceilings, floors and furnishings.
3. Minimize decorative lighting.
4. Turn off indoor lighting close to the perimeter of the building during the daytime if feasible.
5. Adjust blinds/drapes to maximize the use of natural light except where the direct sunlight causes heating in an air conditioned room.
6. Re-examine the security lighting both internal/external.
7. Establish a schedule for cleaning light fixture diffusers.
8. Set custodial hours to maximize use of natural light; when artificial lighting is required turn on only in immediate work area. If custodian also handles lawn care, consider having custodial activities during the daylight hours and the groundskeeping activities in the late afternoon or early evening. Sprinkling should occur in the cooler parts of the day (early morning or late afternoon).
9. Explore the use of solar film on those windows receiving direct sunlight.

C. Water

1. Match water heating temperature and equipment to the need; turn off when not in use.

a. In schools, water heaters are frequently used to only 15% of their capacity. (Studies have shown that people do not use less water because it is hotter).

2. Use separate water heaters for each need when there are multiple temperature needs (110-115 degrees for people, 180 degrees for sanitizing).
3. Separate hot water heating from the heating/cooling boiler. (Central water heating systems use twice as much energy as unitary water heaters).
4. Repair water leaks immediately.
5. Establish a lawn sprinkling schedule which conserves water.
   a. Do not sprinkle during the heat of the day!

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